Legionnaires' Disease Prevention and Outbreak Control: Conference Overview

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UTAH DEPARTMENT OF HEALTH

- **Public health epidemiologists and investigators**
- **Infection preventionists**
- **Laboratorians**
- **Healthcare systems administrators**
- **Facility engineers**
- **Environmental health water quality experts**
- **Regulators/inspectors/licensing**
- **Others?**

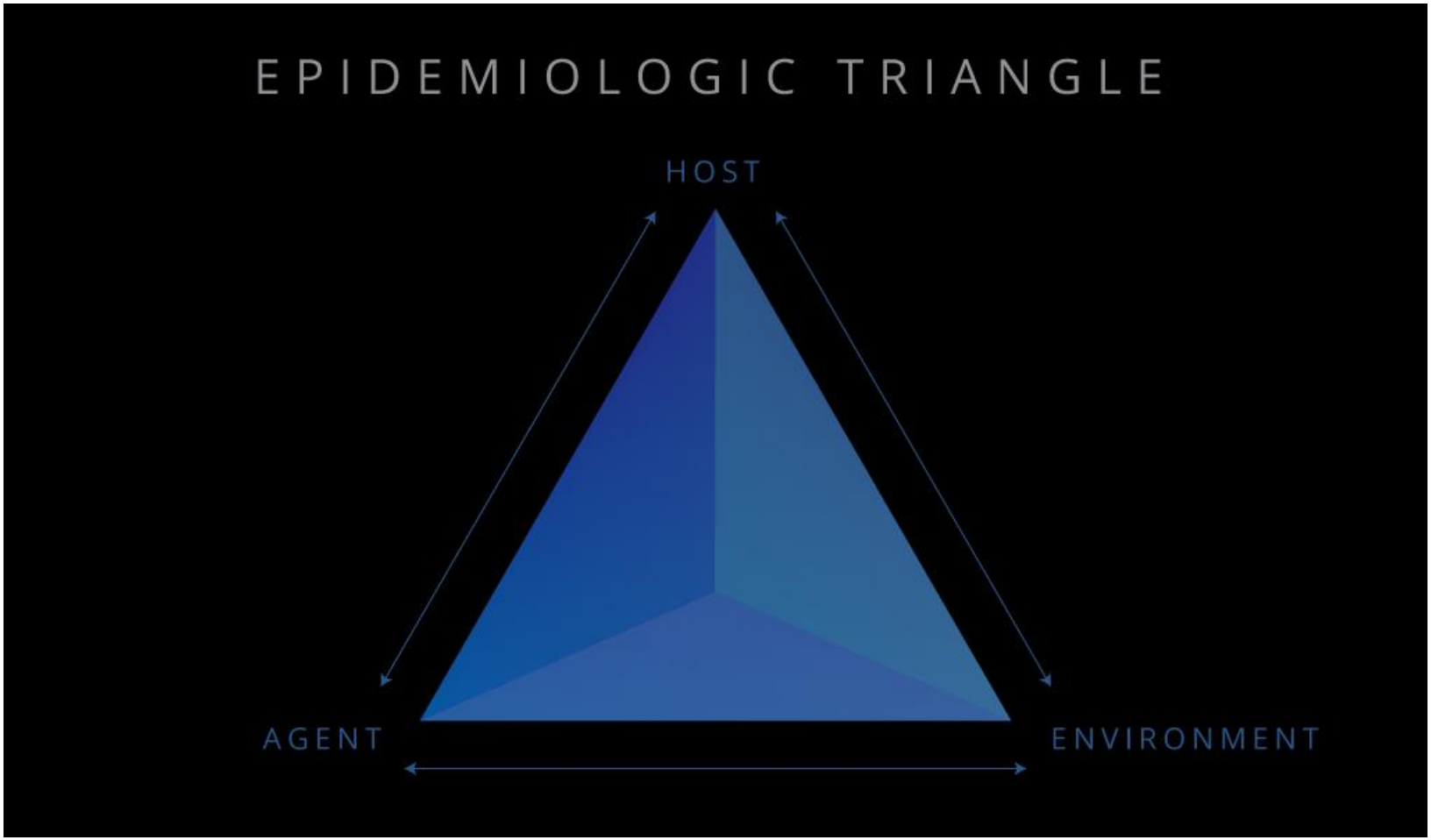
Legionnaires' Disease Investigation, 1976

https://www.cdc.gov/od/science/weweretheregionnaires/index.html

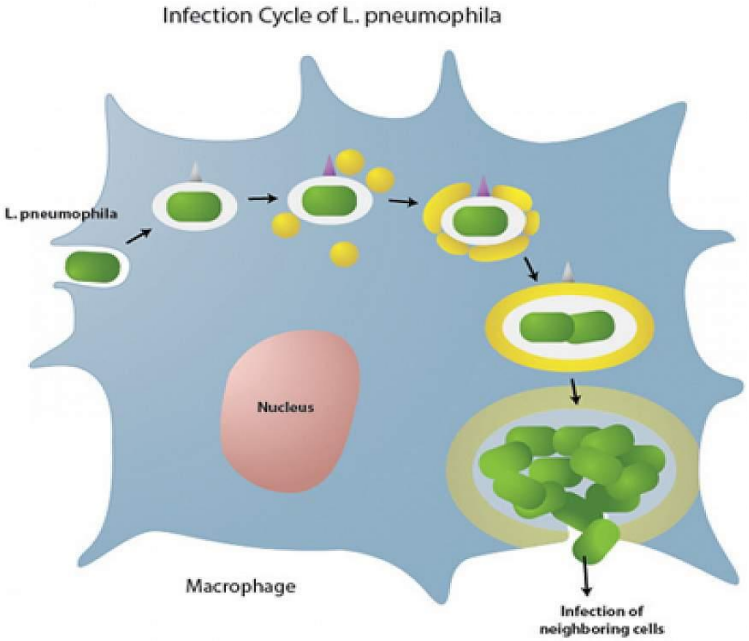
Conference Objectives

- Provide an update on Legionnaires' Disease (LD)
- Understand how LD can be prevented
  - New industry standards and implementation
  - Regulations and monitoring
- Hear from other health departments on how they approach LD outbreak investigations and primary prevention
- Develop a Utah-specific collaborative approach to prevention and control of LD

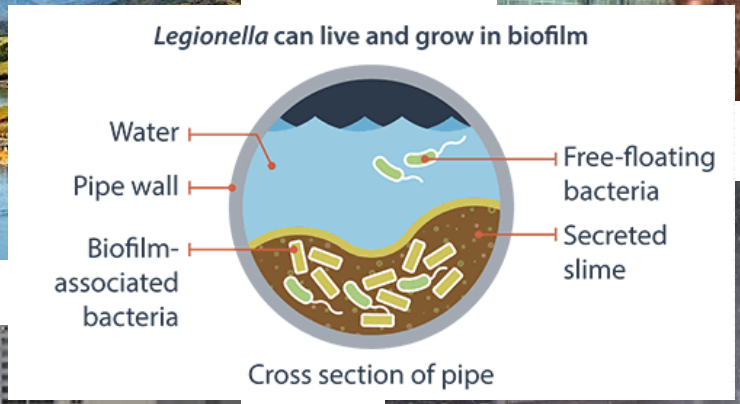
LD: a “Modern” Infectious Disease



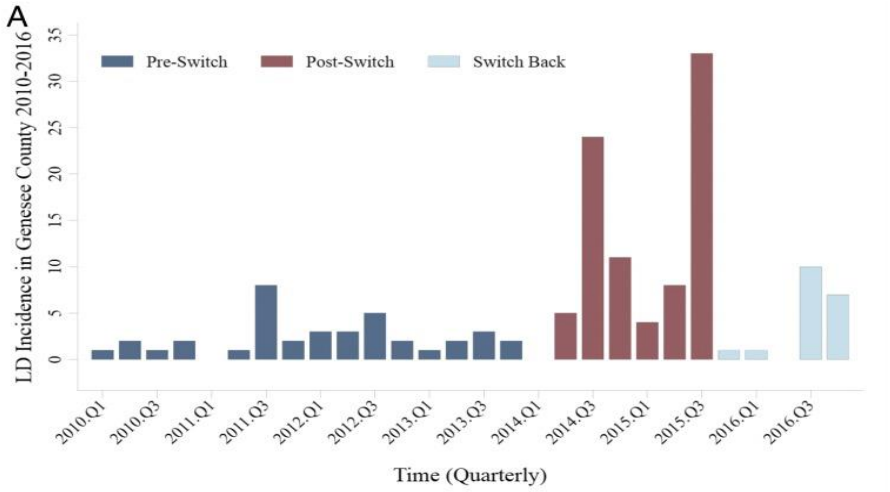
The Agent: *Legionella pneumophila*

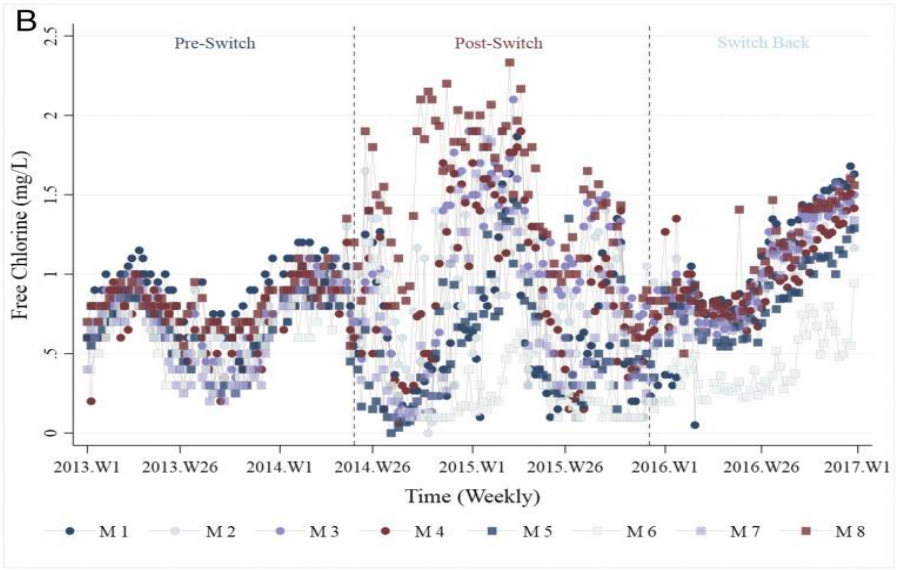


Environmental Factors



Legionnaires' Disease Outbreaks Following Switch in Water Source, Flint, Michigan





- Switch resulted in greater fluctuations in and overall lower levels of chlorine in drinking water
- Resulted in 6.3-fold increase in cases of Legionnaires' Disease

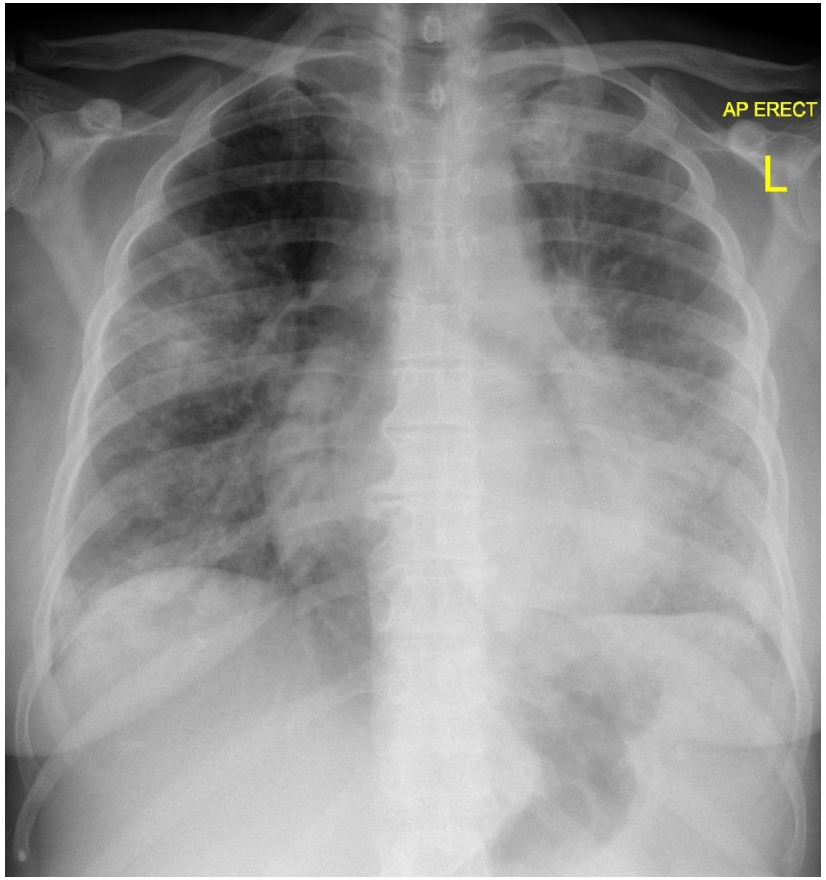
Source: Zahran S. *Proc Nat Acad Sci*, Feb 2018

Host Risk Factors

- Mild to severe pneumonia; 1 in 10 cases die
- Elderly, aged >65 years
- Male>Female
- Underlying immunosuppression
- 1 in 4 cases occur in healthcare settings

Clinical Features

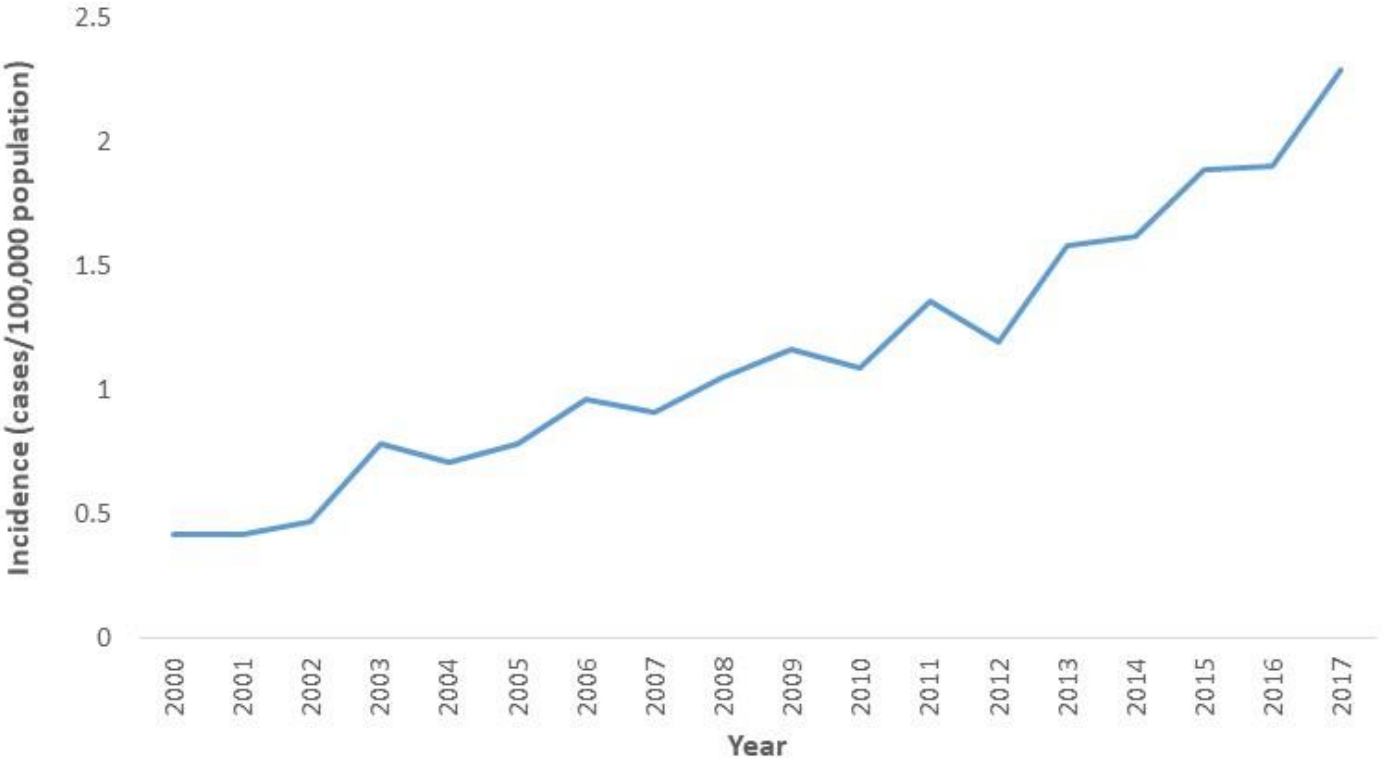
- Mild (e.g., Pontiac Fever) to severe respiratory symptoms: fever, cough, and shortness of breath
- Incubation period: 2-10 days after exposure to the contaminated water source
- Chest x-ray: patchy infiltrates
- GI symptoms: nausea, vomiting, diarrhea
- Failure to respond to beta-lactam monotherapy



Diagnosis and Laboratory Testing

- Urine antigen testing (UAT)
- Bacterial culture
- Others:
  - Polymerase chain reaction (PCR)
  - Direct fluorescent antibody staining (DFA)
  - Serology: acute and convalescent specimens for retrospective epidemiologic investigations

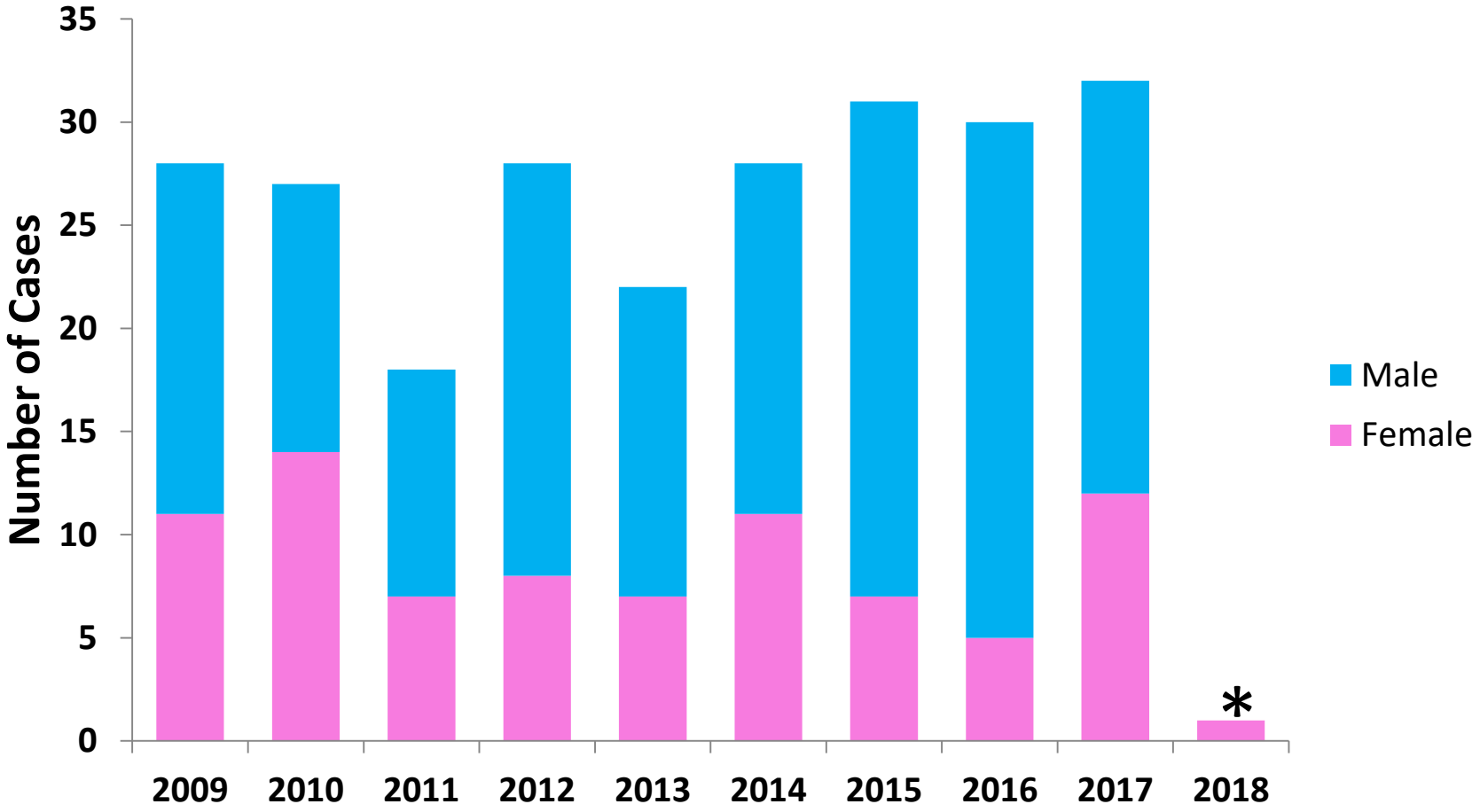
Legionnaires' disease is on the rise in the United States



Rate of reported cases increased 5.5 times (2000–2017)

Source: National Notifiable Diseases Surveillance System

Legionnaires' Cases in Utah

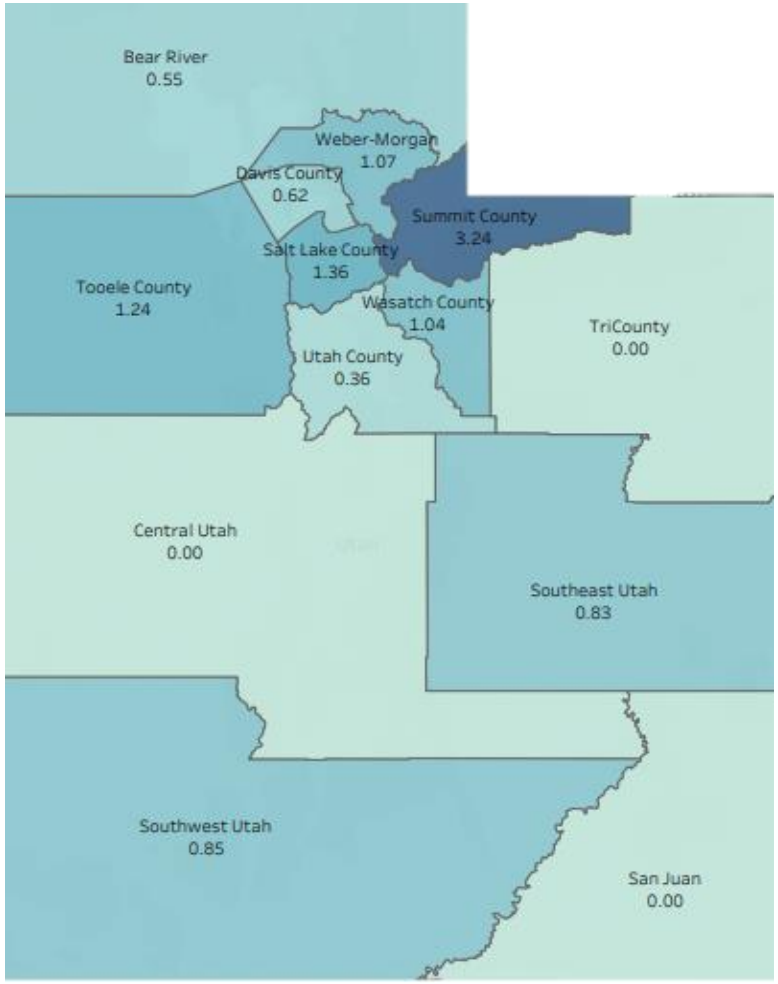


Age Distribution

Age

- Mean age of Utah confirmed cases: **62 years**
- 80% of Utah confirmed cases were in patients ≥50 years
  - 81% of nationally confirmed cases in patients ≥50 years
- Utah incidence rate in patients **85 years and older: 11.74 per 100,000 population**
  - Higher than the 2015 national rate of 8.16 per 100,000 population for this demographic

Average Annual Incidence of LD, Utah 2013-2018



Average Annual Incidence per 100,000 population

0.00 3.24

Role of Public Health and Government in Legionnaires' Disease

Surveillance (Case Detection)

Investigations (Individual and Outbreaks)

Mitigation Measures and Follow-Up

Primary Prevention

Primary Prevention

- *Legionella* grows best in large, complex water systems that are poorly managed
  - 9 of 10 outbreaks are caused by problems in water systems that are preventable by better water management

  https://www.cdc.gov/grand-rounds/pp/2019/20190501-Legionnaires-Disease.html
- Key Message: Effective water management programs can reduce the risk of Legionnaires' Disease